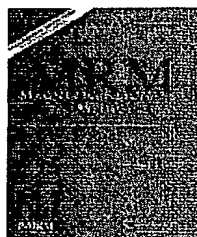




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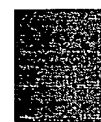
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Full Paper

Vascular stents as RF antennas for intravascular MR guidance and imaging

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Keywords

atherosclerosis; Wallstent; stent deployment; MR guidance; intravascular MRI; interventional MRI

Abstract

Stent deployment is used to improve the immediate and long-term results of vascular interventions in various vascular sites. X-ray angiography as an imaging modality is often limited in providing an accurate assessment with regard to vessel size, plaque calcification, or stent deployment. In this study, the potential of using the stent endoprosthesis as a radiofrequency (RF) receive-only probe for MR guidance and lesion imaging was investigated. Three different principles were developed to visualize stents actively, the first employing the stent as a loop antenna, the second employing the stent in an electrical dipole configuration, and the third employing the stent in a hybrid configuration as a coaxial line antenna. The three configurations resulted in different signal characteristics. Based on two of these antenna configurations, stent deployment devices were built and evaluated in vitro as well as in vivo sheep experiments. Active stent visualization allows real-time MR guidance through the vessel tree and monitoring of stent deployment. In addition, the stent antenna may become useful for high resolution imaging of the vessel wall. Magn Reson Med 42:738-745, 1999. © 1999 Wiley-Liss, Inc.

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